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ABSTRACT

Black preschoolers were studied for the effects of memory enhancing training strategies, socioeconomic status, and the order of free and cued recall on story comprehension. The study also tested the utility of Kintsch's expository text analysis procedures in describing the structure of children's stories and children's oral recall of stories. In one study group, researchers introduced verbal/kinetic strategies (dramatization to solve protagonists' conflicts in stories), while in the other, verbal/symbolic strategies (use of language to describe abstract concepts and summarize the conflict in stories) were used. After training, subjects listened to a story and recalled it in either of two orders: (1) free recall, followed by cued recall through questions; or (2) cued recall followed by free recall. Children's recall was analyzed for fluency, personalized comprehension, and quality of comprehension. The Kintsch Text Analysis Procedure proved useful for identifying semantic and structural elements of the story and the presence of intrusion and inference in recall. Middle class children demonstrated better comprehension than lower class children. Both training strategies helped to improve memory, but verbal/kinetic strategies produced more positive effects than verbal/symbolic strategies. Finally, children showed more coherent story recall in immediate free recall than in recall after questioning. (Author/MJL)

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Children's Story Comprehension as a Function of Socioeconomic Status, Problem Solving Training, and the Order of Free Recall

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Running head: Story Comprehension

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Abstract

Story understanding was described in terms of fluency, personalized comprehension, and quality of comprehension. These aspects of understanding depended on the nature of deletions and intrusions in free recall. Semantic and structural variables in a story were described using Kintsch's procedures for analyzing expository texts. These components of underlying structure were applied to the oral recall of preschool children. Children's internal representation of a story was affected by three factors: socioeconomic status, problem solving training, and the order of free recall. Results indicated that middle socioeconomic status black children have better developed schemata for understanding stories than their lower socioeconomic status counterparts. Another major finding was that problem solving training requiring active encoding and emotional identification with a protagonist enhances fluency and personalized comprehension in story recall. Other results suggest that the bridging of story content to prior knowledge is better facilitated by immediate free recall than question answering about the story. The results were related to characteristics of the preschool child during a sensitive period of psycholinguistic development. Implications for the teaching-learning process were drawn for advantaged and disadvantaged children.

Children's Story Comprehension as a Function of Socioeconomic Status, Problem Solving Training, and the Order of Free Recall

When a young child listens to (or reads) a story, how is that child's understanding of the story represented in memory? What factors affect the child's comprehension of the story? This article describes story comprehension as a personalized understanding because prior knowledge and its organization in memory interact with the content and structure of the story. An understanding of how young children process and code stories is important because story comprehension involves prerequisite text processing skills needed in most school learning. Piaget's (1955) distinctions between children's and adults' conceptual representation of experience are well documented. Likewise, story and text comprehension may be quite different for children and adults. For the preoperational child (using Piaget's concept), story comprehension is the exercise of characteristic problem solving processes. Young children listen to, remember, and even act out stories in their effort to interpret experience. In so doing, they acquire a generalized schema for interpreting large segments of oral prose. It is the comprehension of large segments of prose, as opposed to sentences or brief passages, which closely approximates most real world learning contexts.

Story understanding is not just a reproduction of story propositions in free recall, but a personalized comprehension of the story. The quality of understanding depends upon the way the story content and structure interact with prior knowledge. Fluency of ideas in story recall may also be associated with the quality of ideas and personalized comprehension. Free recall should reflect the idiosyncratic organization of ideas in semantic memory (Gagné, 1978; Ortony, 1975).

Just as there is a need to describe how prior knowledge interacts with a story to form a personalized representation in memory, there is also a need to describe factors likely to affect story comprehension. Comprehension is a psycholinguistic process with the representation of meaning in memory conceptually greater than the surface structure of language. Socioeconomic status is important because higher strata have excelled in many learning outcomes, including the ability to read and understand texts. Lower socioeconomic groups have consistently demonstrated deficits in verbal ability compared to more advantaged groups (Carroll, 1972; Gallagher, 1975; Loban, 1976; and Riessman, 1963); yet, differences have not been described in the underlying structure of language.

Other factors affecting story comprehension raise questions which are related to instruction. Can young children be taught encoding strategies for comprehending stories that positively affect the structure of memory? Does the retrieval process used by the child in remembering stories also affect generalized story schemata?

These questions imply the existence of a dynamic interaction between active encoding and construction in free recall that will potentially affect what will be remembered from a story and how it will be stored.

Underlying Text Structure

Text or story comprehension is affected by factors within the text as well as within the comprehender. Text processing theorists such as Kintsch and Van Dijk (1978) have suggested that characteristics such as the number of idea units and the extent to which these are coherently related in the underlying structure of the text or story influence the amount and quality of information readers extract from the story. There is considerable support that semantic and structural factors within the text and the comprehender affect adults recalling expository passages after reading (Bransford and Johnson, 1972; Kintsch and Monk, 1972; Kintsch et al., 1974; Miller and Kintsch, 1980). There are two issues in text processing research, however. The first is the extent of generalizability of text processing models and story grammars across texts and stories (Reder, 1980). The second is the extent to which hypothesized text structures and story grammars actually describe meaning and its organization in semantic memory (Black and Bower, 1980; Meyer et al., 1980). Therefore, one purpose of the present study was to address the question: Will a procedure, primarily tested on adult subjects, for describing the underlying structure of expository texts, also describe the underlying structure of a story and children's oral recall of the story?

Story Comprehension and Developmental Characteristics of the Preschool Child

Preschool children have not often been the subjects in prose comprehension research because they are unable to read and write. How this age group understands reading material is important, however, because early verbal skills generally determine later academic competence (Bloom, 1964; Bruner, 1964). Much school learning requires an early focus on reading and writing skills. Yet, children who haven't first developed oral expression and listening skills for the internalization of experience do not profit readily from early reading instruction (Loban, 1976).

Stories are a medium frequently used for developing listening and oral comprehension skills in five-year-olds. Children in the late preoperational stage may have acquired generalized schemata for understanding stories if they have been read tc a great deal or if they have spontaneously acted out stories during sociodramatic play. This period may be a critical time for developing psycholinguistic competence because language is combined extensively with action and imagery in conceptual thought for the first time. Later psycholinguistic competence may be hindered for children who fail to integrate language with action and imagery during this sensitive period in cognitive development (Taylor, 1976).

Socioeconomic status and comprehension. The sequence of play and language development are parallel during the preoperational period. At the age of five, most children spontaneously participate

in sociodramatic play. It is during this spontaneous acting out of social and fantasy roles that language expression is integrated with motor and perceptual means of encoding (Cowan, 1978). Poor verbal skills of the disadvantaged might be partially explained by a failure of lower socioeconomic status children to adequately combine newly acquired language skills with previously developed action and imagery channels of encoding (Smilansky, 1968). The disadvantaged continue to develop conceptual understanding of experience, but this understanding may not be evident in the surface structure of language expression (Labov, 1970). Equality between the advantaged and disadvantaged in conceptual understanding and other abilities has been substantiated when the mode of expression is kinetic rather than verbal (Gallagher, 1975; Haley, 1978; Torrance, 1974, and others).

Comparisons of socioeconomic strata on linguistic competence, made at the level of the surface structure, have also constituted racial comparisons since blacks have predominantly represented lower class status and whites have occupied middle class status. There is a need to describe the prose comprehension of middle class blacks, a group often neglected in studies using socioeconomic status as an independent variable. Therefore, a second question addressed in the present study was: Will differences between middle and lower class blacks occur in the surface and the underlying structure of language?

Active encoding in children's comprehension. Long-term memory storage is composed of nonassociative and associative components. Nonassociative memory contains schemata for motor and perceptual features with episodic memory a subset. Episodic memory is memory for particular events bound by time and space. Associative memory contains conceptual memory with semantic memory a subset. It contains generalized knowledge abstracted from language. The interaction between episodic and semantic memory during active learning enhances the structure of long-term memory (Tulving, 1972).

Young children also use motor and perceptual levels of processing to form conceptual thought in active learning (Levin, McCabe, and Bender, 1975; Varley, et al., 1974; Wolff and Levin, 1977). Yet, story comprehension requires the exercise of semantic memory in five-year-olds which may not contain well-developed schemata for understanding stories. Such schemata may require the interaction of motor, imagery, and language levels of processing stories. Such an interaction would likely have two results: (1) the stability of concepts in long-term memory storage should be increased by the simultaneous use of different levels of processing (Paivio, 1976); (2) the transfer value of information in the story to prior knowledge should be enhanced because active working memory would interact with long-term storage (Baddeley, 1978).

An interaction of motor, imagery, and language levels of processing should positively affect story comprehension for both

the advantaged and the disadvantaged child, but in different ways. Opportunity to process stories using motor and perceptual encoding might strengthen a kinetic preference for the disadvantaged. Conceptual memory for the advantaged might be strengthened by adding motor and perceptual levels to verbal processing of stories.

The dynamics of the teaching-learning process which might affect story comprehension have not been related to text processing methodology. Active encoding includes (1) the interaction between semantic and episodic memory, (2) the use of verbal and kinetic expressive modes, and/or (3) the interaction of verbal and imagery components of symbolic thinking. It was hypothesized that active encoding would significantly enhance story comprehension for young children. Therefore, a third major question was addressed in the study. Can young children be taught encoding strategies for comprehending stories that enhance the structure of memory? This question is important if early childhood is a critical period for developing verbal competence and if certain groups (e.g. the disadvantaged) fail to spontaneously develop such cognitive schemata.

Construction in free recall. Remembering stories, whether in free recall or in response to question, is a constructive process activated by the interaction of working and long-term memory. Thus, the act of remembering was expected to enhance the stability of information in long-term storage and the bridging of story content to relevant knowledge (Miller and Kintsch, 1980). Yet, the nature of construction in free recall and question answering might be quite different.

The retrieval process used by subjects is a source of semantic restructuring (Mayer, 1977). It can be argued that the act of recalling a story in one's own words immediately after hearing it strengthens existing schemata for understanding stories. Thus, free recall provides a salient measure of organization in semantic memory because it involves an idiosyncratic remembering process (Anderson & Ortony, 1975). On the other hand, questions designed to structure memory for the proper sequence of major events in the story could produce more accuracy and coherence in later free recall of the story. This result might be anticipated for children who lack adequate structures for remembering stories in a coherent way. Organizers have facilitated adults' memory for texts (Mayer and Bromage, 1980). Therefore, the fourth question addressed for the present study was: How will question answering affect semantic and structure components of children's memory of a story in free recall?

Method

Subjects

The initial sample consisted of 89 black children stratified into two levels of socioeconomic status. The advantaged sample included 47 children enrolled in the kindergarten classes of a private day care center in a predominantly black middle class neighborhood of a southern urban area. The disadvantaged sample consisted of 42 five-year-olds attending a federally funded child development center located in a housing project in a lower socioeconomic neighborhood of the same city. The male-female

ratio in each group was comparable. Subjects were further checked for rate of absenteeism, cost of education, and for marital status and type of employment of parents to verify assignment to advantaged and disadvantaged categories before inclusion in the sample. Attrition due to relocation, excessive absenteeism, and inability to respond to stimuli presented at the end of the study because of severe behavioral or speech disorders reduced the sample to 79. There were equal losses in the two socioeconomic groups.

Training Procedures

Can young children be taught encoding strategies for comprehending stories that enhance the structure of memory? To address this question, random assignment of subjects to three problem-solving training conditions was made separately for advantaged and disadvantaged children. Training procedures in two problem-solving methods occurred in daily 40-minute sessions for a six-week period at both preschool facilities. Control groups continued in the traditional programs at their separate schools. Both training procedures emphasized emotional identification with a protagonist. One procedure consisted of verbal/kinetic strategies for comprehending stories. This procedure combined role playing and dramatic enactment to solve conflicts of protagonists in familiar fairy tales and novel stories about typical problems children face. Stories were actively experienced in a group setting by subjects acting out roles, generating better ways for the protagonist to solve the problem at hand, and refining solutions through guided improvisational enactment.

Idiosyncratic strategies for solving conflicts introduced in the stories were exercised and reinforced. This approach was intended to aid in the transfer of psychomotor learning to conceptualization in semantic memory. This transfer was expected because the interaction of working and long-term memory was activated and both verbal and kinetic expressive modes were used simultaneously.

The second training procedure used verbal/symbolic strategies for understanding stories. This method required the use of language to describe abstract concepts, such as physical attributes and behaviors, to infer emotional states, and to summarize the gist of a conflict presented by the protagonist. The use of language in these ways was expected to invoke the interaction of verbal and imagery components of symbolic thought. This procedure was more structured than the verbal/kinetic approach and used other children in the group as protagonists telling personally relevant stories.

The effects of both group strategy training procedures on advantaged and disadvantaged children were compared to a control group. Training procedures for the former group were based on sociodrama as a problem solving process (Haley, 1978; Torrance, 1975) and for the latter on interpersonal problem solving skills (Carkhuff & Pierce, 1975; Haley, 1978).

Free Recall Procedures

Language samples were obtained individually from each subject in a standard manner at the end of the six-week training period. The author read an open-ended story entitled "The Snowhouse" to each child. Half of all subjects were asked to recall the story in their own words

immediately after hearing it. Then they answered questions about the story through a form of cued recall. The other half of the subjects answered questions about the story immediately after hearing it and then gave their remembrance of the story in free recall. The order of free recall, either immediate or following questions about the story, was included as a variable to determine whether processing in free recall is facilitated or hindered by questions designed to structure story recall.

Text Analysis

An adaptation of Kintsch's procedures (1974; 1976) for text analysis was applied to a story entitled "The Snowhouse," taken from Dinkmeyer (1970). This is a 550-word story containing a conflict to be resolved. The macrostructure of the story is as follows: (1) Billy and Barbara are excited about playing in the snow with their friends. (2) Billy and Barbara run outside and enjoy the way the snow feels. (3) All the children in the neighborhood have a snowball fight. (4) Billy decides to go back inside in spite of a warning that he can't play in a snowhouse the children are planning to build if he doesn't help build it. (5) Billy watches from a window as the other children build the snowhouse. (6) All the other children eat lunch at Billy and Barbara's house. (8) The other children confront Billy with the contingency stipulated before Billy went inside. (9) Billy tells his mother the other children won't let him play.

A text base containing 242 propositions in these nine episodes of the macrostructure was constructed to describe the underlying meaning and coherence of the story. The problem to be solved by the protagonist was directly confronted in Episode 8. Table 1 contains the propositional structure of this episode as an example of the way the text base of the story was constructed.

Insert Table 1 about here

Fluency in Story Recall

Fluency, defined as the number of words in free recall and in question answering, was used as a measure of story comprehension since quantity of ideas might be associated with quality of understanding in recall (Tulving, 1972). Of three comprehension variables of interest in the present study, fluency was expected to be the least sensitive to meaning in semantic memory.

Personalized Comprehension in Free Recall

Each child's free recall of the story was analyzed by constructing protocols for each individual that provided a detailed description of personalized comprehension and comparing these to the text base of the story. The text base variables identified in the story and examined in the oral recall of 79 five-year-olds consisted of one semantic and three structural components of personalized comprehension. Propositions were the basic idea units, containing one or more word concepts, which made up the semantic component of the text base. Proposition order and repetition were within-episode

elements of the structural component. Order was the position of propositions defined by their logical sequence in the text base of the story. Repetition was the reference to word concepts or entire propositional units. Episode sequence was an element of the macro-structure, the abstract level of the text base made up of the essence of each episode. These structural elements described cohesiveness within and between episodes of the story while propositions defined basic meaning units.

Four elements of underlying text meaning--propositions, proposition order, proposition repetition, and episode sequence--were represented in children's free recall of the story. These variables were of interest because they addressed questions about the importance of sequences and linkages in story comprehension both within and between episodes (Glenn, 1980; de Beaugrande and Miller, 1980); the nature of basic idea units as listeners (or readers) transform them (Black and Bower, 1980; Denhière and Le Ny, 1980); and the influence of semantic and structural variables on the oral production of children who do not yet read and write proficiently.

Quality of Comprehension in Free Recall

In the present study, the quality of understanding depended on the way existing schemata and the story content matched. Intrusions represented any propositions in free recall which did not match a proposition in the underlying story structure with equivalent meaning. Deletions and intrusions usually occur in recall because personalized memory is a unique representation of experience. Omissions occur

because story propositions are not coded verbatim. Intrusions in children's recall occur because of idiosyncratic cueing of stored information. They reflect the interaction of new information and the organization of prior knowledge. They occur because free recall is a constructive process. Intrusions have positive and negative effects on comprehension.

In this study, positive intrusions in children's free recall added to the quality of understanding. They represented elaborations which clarified meaning or propositions which could logically be inferred from the context of the story. Negative intrusions detracted from the quality of comprehension. They reflected incorrect remembrances of the story or illogical elaborations. Errors were readily identified with their mismatch in the text base of the story.

Scoring the Psychological Text Base

Each subject's free recall of the story, "The Snowhouse," was taped and transcribed verbatim. This oral language sample was then analyzed for the total number of words and the number of propositions it contained. Each proposition was numbered. These were compared to the standard text base to determine which ones duplicated the story precisely. The number of the proposition in the subject's text base should have corresponded to the number of the identical proposition in the standard text base if all propositions from the story were recalled in the exact order.

Propositions represent basic idea units which have meaning in the context of the entire story. The propositions from the

subject's text base were grouped and categorized by the episodes in which they occurred in the story. Propositions were not sub-categorized as predicators or arguments. Each subject received a score for the order of the episodes he recalled by totaling the number of episodes in the correct sequence. The highest possible score was 9. Each episode was only counted once, even if parts of one episode were separated in the subject's free recall of the story. For example, if a child recalled parts of episodes of the story in the following order: 1, 2, 3, 5, 4, 6, 5, he would receive a score of 5. In this case, episode number 4 was out of order and episode 5 was duplicated.

The order of propositions within the episodes was also tabulated. There were 242 possible propositions to be recalled from the story. The following example demonstrates how the order of propositions was scored: If a subject recalled proposition numbers 36, 37, 38, 40, 41, and 42 from episode 4, which contained propositions 1-54, that subject would receive a score of 6 for the propositions he remembered in the correct order.

The repetition of propositions within episodes was also tabulated. Whenever any proposition was tied to another proposition for clarity of meaning, or whenever a proposition could not stand alone, a reference was made to the proposition or propositions which completed the meaning. The following excerpts from episode 4 of one subject's language sample demonstrates the rule for scoring repetition:

The children told Billy, "If you don't help, you can't play in the snowhouse."

36 [Told, (children, Barbara), Billy]

37 [if-then, 36, 38, 40]

38 [don't help, Billy]

40 [can't play, Billy]

41 [in, 40-42]

42 [snowhouse]

This subject received a score of 7 for repetition in this episode. The "if-then" conjunction was tied to propositions 36, 38, and 40. The proposition "in" was connected to propositions 40 and 42. The word concept "Billy" was referred to twice in the text base after its introduction in proposition number 36, the highest order of propositions in this sequence.

Intrusions were identified in each subject's text base as those propositions which did not correspond in meaning to an equivalent proposition in the standard text base of the story. Intrusions were classified as either positive or negative to describe the quality of comprehension. Positive intrusions were those which could logically be inferred from the original text. In episode 5 of the story, Billy watched from the window while the rest of the children built the snowhouse. One subject included a statement within this episode which could easily be inferred from the context of the story: "Billy felt sad." According to the propositional

analysis, this statement should be broken down into two propositions which are both positive intrusions: [Felt, Billy] is one propositional unit while [sad, Billy] is another, which is as adjective refers back to the former proposition. See Kintsch (1974) for more detailed information regarding the analysis of a text base. Reliability coefficients on the scoring of propositions, episode order, proposition order, and proposition repetition ranged from .86 to .97 with an overall reliability of .94.

Results and Discussion

Story comprehension was described by analysis of the surface and underlying structure of the oral recall of 79 advantaged and disadvantaged five-year-olds using separate multivariate analysis of variance procedures on the three clusters of story comprehension measures: fluency, personalized comprehension, and quality of comprehension. Surface structure measures included fluency in free recall and in question answering. Propositional meaning and coherence in the underlying structure of free recall were described as measures of personalized comprehension (the number of propositions, propositions in the correct order, the repetition of propositions, and episodes remembered in the logical sequence) and quality of comprehension (the number of positive versus negative intrusions). Univariate tests were also performed on each dependent variable within a cluster. Duncan's new multiple range test was used to analyze statistically significant differences in the problem solving training factor because more than two comparisons were made. Eta coefficients were calculated to describe the magnitude of significant effects.

The problem solving training factor, F (6/130) = 3.09, p.<.01, showed differences on the fluency cluster beyond chance variation. Socioeconomic status, F (4/64) = 3.18, p <.02 and F (2/66) = 10.64, p <.01, and Order of Free Recall, F (4/64) = 3.67, p <.01, and F (2/66) = 5.18, p <.01, produced main effects on the personalized comprehension and quality of comprehension clusters, respectively. The order of free recall factor interacted with the problem solving training factor, F(8/128) = 3.02, p<.01, and the socioeconomic status factor, F(4/64) = 3.06, p<.05, on the personalized comprehension cluster.

Univariate analysis of variance on each of the dependent variables further revealed a main effect of problem solving method on the four personalized comprehension measures [Propositions, F (2/67) = 3.69, p <.05; Proposition Order, F (2/67) = 3.92, p. <.05; Proposition Repetition, F(2/67) = 3.52, p <.05; and Episode Order, F (2/67) = 4.85, p <.01] and on the negative intrusions variable, F (2/67) = 3.22, p <.05, in the quality of comprehension cluster. Socioeconomic status interacted with problem solving method, F (2/67) = 3.28, p <.05, and order of free recall, F (1/67) = 4.53, p <.05, on the negative intrusions variable. Eta coefficients, calculated for all significant F tests, ranged from .24 to .59, indicating a moderate effect size.

One purpose of the study was to test a procedure for analyzing expository material on children's oral recall of a story. Other purposes were to describe the effects of socioeconomic status, problem solving training, and the order of free recall on story comprehension. The means of these factors and significant univariate

results are described in Table 2 and 3 for each of the eight story comprehension variables. A discussion of these questions follows:

Insert Tables 2 and 3 about here

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1. Will a procedure for describing the underlying structure of expository texts primarily tested on the recall of adult subjects also describe the underlying structure of a story and children's oral recall of that story?

A procedure for analyzing texts was sensitive to several semantic and structural elements of the underlying structure of a children's story. These elements were also evident in children's oral production of the story. This finding suggests that procedures for analyzing expository texts are useful for analyzing stories and can be applied to the oral recall of children, whereas the generalizability of story grammars has been questioned.

The adaptation of the Kintsch text analysis procedure was particularly sensitive to information subjects recalled which was not a reproduction of story propositions. Subjects made intrusions in story recall, presumably in their effort to tie the meaning of the story to individual knowledge in semantic memory. Inferences and errors (positive and negative intrusions) occurred as the result of internal and external sources. Some examples will clarify the nature of intrusions in subject's free recall. These suggest that

an interaction occurs between what is presented in the story and prior knowledge. A serendipitous finding that pictures influence story comprehension provides direction for future research.

Pictures in the snowhouse story were one source of external inference. Children's ability to infer emotional content from the story represented an internal source of inference. In the snowhouse story, Billy watched from a window while the other children built a snowhouse. Several children reported in free recall that Billy felt sad. This inference could have been cued by a picture of Billy looking out the window or from a personal understanding of how it feels to be left out of the group.

The structure of the story itself was another potential source of inference. The snowhouse story did not conform to the typical children's story in that it ended with the conflict unresolved. The children who built the snowhouse told Billy he couldn't play in it because he hadn't helped build it. In the last episode of the story, Billy told his mother the other children wouldn't let him play with them, but the story ended without her response. Many children provided endings to the story which suggests they were responding out of a pre-existing generalized story schema.

External and internal sources of inference both affected specific errors. Remembering that the children in the story drank chocolate milk instead of hot chocolate is an example of an error which was not likely to have much impact on conceptual memory for the story. Other specific errors apparently came from pictures interacting with prior experience. Several children described Billy as sitting by a radio or a heater as he watched from the

window. He was actually sitting beside a television in the picture. The T.V. perhaps looked more like other objects in the children's environments.

Illogical elaborations of the story were probably due to extraneous information also called up by a schema match. Because free recall is a constructive process, memory for inappropriate particular events might have been tagged and elaborated by the matching of incoming information and generalized schemata in semantic memory. For example, the act of telling about the children in the story playing in the snow led a few subjects to elaborate their own personal experiences in the snow. Novelty and interest, internal sources of intrusions, might have influenced such responses since the subjects in this study lived in an area that receives little snowfall. It should be noted that the constructive process which leads to negative intrusions is also the source of positive intrusions.

2. Will differences in the surface and underlying structure of story recall favor middle socioeconomic status children?

The psycholinguistic performance of middle class blacks was described in a comparison of advantaged and disadvantaged children. Socioeconomic status comparisons of linguistic competence are often confounded by race and are based on surface structure measures. Middle class blacks comprehended a story better than poor blacks, suggesting that socioeconomic status is more likely a determinant of psycholinguistic competence than race. Differences were found in favor of the advantaged in the underlying structure of language,

but not in the surface structure. This finding suggests that surface structure measures, like fluency, are not sensitive measures of understanding in semantic memory.

The personalized comprehension measures for ordering of propositions and episodes and the repetition of propositions were the most sensitive to differences between socioeconomic status groups in information processing in semantic memory. These three structural measures represent the associative ability of a young child in providing continuity to the text base in each individual's semantic memory. Advantaged children displayed better skills in processing information in semantic memory by orally representing what they heard in the context of the semantic memory of each individual. This finding yields support to Smilansky's hypothesis that oral language skill deficits are a reflection of the experiences stored in the early formative years; that deficits reflect the extent to which new experiences are tied to information already in existence in semantic memory and to which new associations between existing schemata are made.

Other socioeconomic differences were related to the quality of comprehension measures. Advantaged children made more positive intrusions or inferences in remembering the story while disadvantaged children made more negative intrusions or errors. Positive intrusions may represent the ability of advantaged children to restructure and form new associations among the concepts for knowledge and experience

stored in semantic memory. Negative intrusions may reflect the environment of disadvantaged children which has been described as a bombardment of stimulation which becomes noise to the disadvantaged child who often lives in crowded conditions. Disadvantaged children may learn to screen out much of what they hear and develop patterns of inattention and/or selective listening. Such behavioral patterns may have a negative transfer to such preacademic activities as storytelling.

3. Will advantaged and disadvantaged children's schemata for understanding stories be positively affected by problem solving training?

The implementation of a six-week training program in problem solving strategies was matched to the learning styles of late preoperational children during a critical period for the development of psycholinguistic competence. Both verbal/kinetic and verbal/symbolic strategies for comprehending stories impacted the structure of semantic memory more positively for children receiving such training than for a control group. Verbal/kinetic strategies consistently produced more positive effects on fluency and semantic and structural components of personalized comprehension than the verbal/symbolic strategies, although the advantage was not statistically significant. Perhaps motor involvement plays a somewhat greater role in the conceptual organization of associative memory than imagery induction, although both are clearly influential. Emotional identification with a protagonist,

whether a fairy tale or story character or a real person, may be the key factor in the development of coherent story schemata.

The results suggest that the interaction of kinetic and verbal involvement at the time of encoding aids the young child in internalizing experiences onto cognitive schemata, a process described by Piagetian theorists and cognitive psychologists such as Levin and Allen (1976). Sociodrama seems to enhance story comprehension by reinforcing the interaction of episodic and semantic memory so that meaning is encoded and/or restructed more effectively in semantic memory.

Problem solving training also significantly affected the number of negative intrusions in children's story recall. Children trained in sociodrama made more errors in remembering the story than the control group. This unexpected result might be accounted for by the process of conflict resolution in sociodrama. The sociodrama sessions were characterized by openness and encouragement to free the mind for alternative production without evaluation. The sessions trained the children to offer all possibilities of solutions regardless of how logical they might be so that breakthrough ideas could emerge from the group members. Evaluation came at the end of the process. Possibly this dimension of the sociodrama problem solving process adversely affected the recall of a verbally presented stimulus when a very specific memory for the material was required.

Finally, it is interesting to note that an interaction of socioeconomic status and problem solving method was not supported for any dependent measures. Even though some literature on the disadvantaged supports the notion that this group learns better through kinetic involvement in the learning process, the advantaged blacks in this study responded equally well to sociodrama instruction.

4. Will children's memory for stories be differentially affected by immediate free recall and intervening question answering?

Young children produced more coherent recall of a story when they were able to recall the story in their own words immediately after hearing it rather than following intervening question answering. Apparently using individual organizing strategies enabled the children to relate story content into a personally coherent system of understanding. Intervening questions, designed to provide a structure for later remembering the story in one's own words, detracted from coherent story recall. The results might be explained in terms of overloading working memory. However, the questions deserves further study since teaching strategies recommended for use with most basal reading series for beginning readers employ a great deal more emphasis on question answering about the story than free recall of the story.

The personalized comprehension measure best discriminated by the order of free recall was the repetition variable. Proposition repetition is technically a measure in the text base analysis of the references to or associations with other propositions or word concepts within a propositional units in semantic memory. Proposition repetition was more prevalent in the oral language samples of children recalling a story immediately than following structured recall. Question answering was intended to assist the young child in remembering the orally presented story. However, it was apparently a detractor on at least one measure of the representation of meaning in semantic memory. Two explanations seem feasible. Children remember stories better when they can assimilate them to existing schemata using their own problem solving strategies. Or, perhaps a young child's memory storage becomes overloaded if too much structural retrieval is required. In the latter case, time spent in question answering may use up processing space.

Order of free recall also had an impact on intrusions. Children recalling a story immediately made fewer negative intrusions than children recalling the story following structured recall. Although the literature supports the notion that questions requiring organized recall of information aid in structuring memory for a story, this premise was not confirmed by this study for kindergarten-aged children Children who recalled the story in their own words immediately after hearing it tended to represent the content of the story more precisely. The immediate recall group made very few negative intrusions.

Conversely, the children who responded to questions about the story before repeating the story in their own words made significantly more negative intrusions than the immediate free recall group. This finding suggests that children of kindergarten age remember verbal information more precisely if they are allowed to recall the information in their own words immediately. This result supports the superiority of free recall memory over cued recall memory in the comprehension of stories.

Unpredicted interaction effects of socioeconomic status as well as problem solving method with order of free recall were found on personalized comprehension but not on fluency. Recalling structured material first positively influenced the number of episodes recalled by advantaged children. There was more coherence in the free recall of the advantaged than the disadvantaged when question answering preceded story recall.

Further analysis of the problem solving method by order of free recall interaction indicated free recall following structured recall did not differentially affect problem solving groups on any of the four text base measures of personalized comprehension. However, both verbal/kinetic and verbal/symbolic training produced higher scores on all four measures of personalized comprehension in the text base analysis than the control group in the immediate free recall condition. Apparently, training in either problem solving method provided the young children in this study with a more effective means of representing meaning in semantic memory when

recalling information immediately after hearing it. Control group children had not learned to comprehend oral prose in their regular classroom curriculum as well as children who had been trained in problem solving groups.

General Discussion

In summary, preschool children must develop cognitive schemata for comprehending stories much like the global processes used in thinking more generally. This is accomplished through a problem solving process in which young children listen to, remember, and act out stories in sociodramatic play. These processes occur as part of the normal developmental process for children who are combining action, imagery, and language in conceptual thought for the first time during the late preoperational period. This may be a critical time for children to actively experience stories through emotional identification with the protagonist if they are to develop prerequisite text processing skills necessary for later academic success. The implications are especially important for certain children, such as the disadvantaged, who may not spontaneously develop cognitive schemata for interpreting stories as part of their developmental process. Children can be taught how to solve story problems, and in so doing, they apparently elaborate and strengthen existing cognitive schemata for understanding stories. The exercise of personally coherent systems for processing stories in free recall is apparently more effective than trying to structure children's memory for stories through question answering.

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Table 1

Text Base of Episode 8

"The Snowhouse"

Episode 8: Confrontation With Other Children

190 [Said, (children, Barbara)]
191 [cannot play, Billy, 190]
192 [in, 191, 193]
193 [snowhouse]
194 [Questions, Billy, 190]
195 [Said, child]
196 [told, (children, Barbara), Billy, 195]
197 [before, 196]
198 [if - then, 195, 199, 200]
199 [do not help build, Billy, snowhouse]
200 [cannot play, Billy]
201 [in, 200, 202]
202 [snowhouse]
203 [completed, snowhouse]
204 [Did not know, Billy]
205 [whether-or, 204, 206]
206 [feel, Billy]
207 [mad, 206]
208 [sad, 206]
209 [Wanted play, Billy]
210 [with, 209, 211]
211 [(children, Barbara)]
212 [in, 209, 213]
213 [snowhouse]
214 [But, 215]
215 [appeared correct, 198]
216 [because, 215, 217]
217 [had not helped build, Billy, snowhouse]
218 [Said, Billy]
219 [if - then, 218, 220, 221]
220 [do not let play, (children, Barbara), Billy]
221 [tell, Billy, mother]
222 [Said, Barbara]
223 [tell, Billy, mother, 222]
224 [because, 223, 225]
225 [will say, mother]
226 [correct, 225]
227 [(children, Barbara), 226]

Number of Propositions: 190-227
Order Score: 38
Repetition Score: 56

Text: "You cannot play in the snowhouse," said the children. "Why not?" asked Billy. "We told you before," said Jimmy, "if you don't help build, you can't play in the house when it is finished." Billy did not know whether to be mad or sad. He wanted to play with them in the snowhouse. But what they said did sound kind of right because he really hadn't helped to build the house. "If you don't let me play, I am going to tell my mother," said Billy. "Go ahead and tell her," said Barbara. "She will say that we are right."

Table 2

Means for Fluency, Personalized Comprehension and Quality of Comprehension by Socioeconomic Status, Problem Solving Method, and Order of Free Recall

Story Comprehension Variables	Socioeconomic Status		Problem Solving Method			Order of Free Recall	
	Disadvantaged (N = 37) $\bar{X}$	Advantaged (N = 42) $\bar{X}$	Verbal-Kinetic Strategies (N = 27) $\bar{X}$	Verbal/Symbolic Strategies (N = 26) $\bar{X}$	Control (N = 26) $\bar{X}$	Immediate (N = 38) $\bar{X}$	Following Question Answering (N = 41) $\bar{X}$
Fluency							
Words in Free Recall	83.11	93.74	108.26	89.65	67.62	85.11	92.15
Words in Question Answering	78.86	85.55	95.33	83.96	67.46	89.11	76.22
Personalized Comprehension							
Propositions	29.24	33.95	37.63	35.58	24.81	30.18	33.20
Proposition Order	13.27	19.00	20.11	16.35	12.35	17.76	14.98
Proposition Repetition	13.49	21.19	22.33	17.04	13.19	20.08	15.27
Episode Order	3.70	4.83	5.22	4.00	3.65	4.34	4.27
Quality of Comprehension							
Positive Intrusions	5.51	8.50	6.74	7.85	6.73	6.82	7.32
Negative Intrusions	8.16	3.19	7.44	6.00	3.04	3.05	7.81

Table 3

A Summary of Significant
Main Effects on Story Comprehension

STORY COMPREHENSION VARIABLES		FACTORS AFFECTING STORY COMPREHENSION		
		Socioeconomic Status	Problem Solving Training	Order of Free Recall
Fluency	Words in Free Recall		Children trained in both problem solving methods were more fluent in free recall than a control group. (F = 5.20**)	
	Words in Question Answering		Children trained in both problem solving methods were more fluent in question answering than a control group. (F = 3.66*)	
Personalized Comprehension	Number of Propositions		The free recall of children trained in verbal/kinetic and verbal/symbolic strategies contained more propositions than that of a control group. (F = 3.66*)	
	Proposition Order	The free recall of advantaged children contained more propositions remembered in the correct order than the free recall of disadvantaged children. (F = 6.57**)	Children trained in both problem solving methods remembered more propositions in the correct order than the control group. (F = 3.97*)	
	Proposition Repetition	The reference to other propositions in free recall was greater for advantaged children than for disadvantaged children. (F = 8.08***)	Children trained in verbal/kinetic and verbal/symbolic strategies made more reference to other propositions in free recall than a control group. (F = 3.57*)	Children recalling a story in their own words immediately after hearing it made more references to other propositions than children who first answered questions about the story. (F = 4.19*)
	Episode Sequence	More episodes were remembered in the correct sequence by advantaged children than by disadvantaged children. (F = 6.39**)	More episodes were remembered in the correct sequence by children trained in both problem solving methods than by a control group. (F = 4.85**)	
Quality of Comprehension	Positive Intrusions	Advantaged children made more positive intrusions in free recall than disadvantaged children. (F = 5.54*)		
	Negative Intrusions	Disadvantaged children made more negative intrusions in free recall than advantaged children. (F = 12.15***)	Children trained in verbal/kinetic strategies made more negative intrusions in free recall than the control group. (F = 3.11*)	Children recalling a story in their own words immediately after hearing it made fewer negative intrusions than those who first answered questions about the story. (F = 9.99**)

Note. *p <.05 **p <.01 ***p <.001